

Statement by
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regarding
The U.S. Department of Energy's Plan for
Climate Change Technology Programs

submitted to

The Subcommittee on Energy
The Committee on Science
United States House of Representatives

Madam chair and members of the subcommittee, thank you for the opportunity to testify on the U.S. Department of Energy's plan for climate change technology programs. My name is Judi Greenwald, and I am the Director of Innovative Solutions for the Pew Center on Global Climate Change.

The Pew Center on Global Climate Change is a non-profit, non-partisan and independent organization dedicated to providing credible information, straight answers and innovative solutions in the effort to address global climate change.¹ Forty-one major companies participate in the Pew Center's Business Environmental Leadership Council (BELC), making the BELC the largest U.S.-based association of corporations focused on addressing the challenges of climate change. Many different sectors are represented, from high technology to diversified manufacturing; from oil and gas to transportation; from utilities to chemicals. These companies represent \$2 trillion in market capitalization, employ over 3 million people, and work with the Center to educate the public on the risks, challenges and solutions to climate change.

Global climate change is real and likely caused mostly by human activities. While uncertainties remain, they cannot be used as an excuse for inaction. To quote the National Academy of Sciences, in a statement signed by the academies of ten other nations, as well: "The scientific understanding of climate change is now sufficiently clear to justify nations taking prompt action. It is vital that all nations identify cost-effective steps that they can take now, to contribute to substantial and long-term reduction in net global GHG emissions."

¹ For more on the Pew Center, see www.pewclimate.org.

The Pew Center believes there are three things we in the United States must do to reduce the real and growing risks posed by global climate change: First, we must enact and implement a comprehensive national program to progressively and significantly reduce U.S. emissions of greenhouse gas (GHG) emissions in a manner that contributes to sustained economic growth. Given that U.S. GHG emissions have risen steadily despite fifteen years of voluntary efforts to reduce them, any such national program must include mandatory reductions. Second, the United States must work with other countries to establish an international framework that engages all the major GHG-emitting nations in a fair and effective long-term effort to protect our global climate. Third, we must strengthen our efforts to develop and deploy climate-friendly technologies and to diffuse those technologies on a global scale.

I would like to address the questions you posed to me directly first:

1. What do you see as the key strengths and weaknesses of the plan?

While the draft Strategic Plan provides a fine overview of GHG-reducing technologies and the opportunities each could present over the long term, it does not provide a plan for deploying these technologies, nor does it provide a path to stabilizing concentrations of GHGs. The technologies considered in the Plan are vitally important; however, merely compiling information about them is not sufficient to ensure their widespread penetration into the marketplace.

Markets work when individuals can balance out their own costs and benefits. As with many environmental problems, individuals generally do not receive financial benefits from taking action on climate change. There is clearly a value to society in minimizing damaging climate effects, but the market does not capture that benefit for those who bear the costs. Therefore, simply creating a supply of carbon-reduction technologies does not mean there will be a demand for them. A mandatory constraint on emissions, on the other hand, will make emissions reductions financially valuable to the individuals producing them, creating a demand for emissions-reducing technologies in the marketplace.

The estimates of the technologies' potential contributions to emissions reductions in the Strategic Plan are derived from a report prepared by the Pacific Northwest National Laboratory. The report, "Climate Change Technology Scenarios: Energy, Emissions and Economic Implications",² considers a range of energy scenarios accompanied by a range of possible emissions constraints. Three hypothetical scenarios are included, along with a reference (business-as-usual) scenario. The three scenarios are each evaluated for four different emissions-constrained cases of varying levels of stringency. Only the reference scenario is considered under a "no emissions constraint" case. Yet the reference scenario with no emissions constraint—the situation that best matches the current U.S. technology market and policy direction—is not noted in the Strategic Plan. Instead, only the

² Placet, M., K.K. Humphreys, N.M. Mahasenan. 2004. "Climate Change Technology Scenarios: Energy, Emissions and Economic Implications", Pacific Northwest National Laboratory, August 2004.

analyses that include emissions constraints—an approach contrary to current U.S. policy—are included in the estimates of the technologies’ potential contributions to GHG reductions. This makes it impossible to evaluate the likelihood of the Plan’s success under current policies, and also supports what most people who seriously examine this issue know – that potential reductions are driven by the existence of constraints on emissions and the demand for technology to deal with those constraints, rather than purely on the federal effort invested in technology research and development.

A combination of technology “pushing” activities (such as those discussed in DOE’s plan) with technology “pulling” legislation that mandates reductions of U.S. GHG emissions would be the most effective and efficient way to deploy climate-friendly technology throughout the economy. Our analysis indicates that combining push and pull will give better results than relying on either alone: studies indicate, for example, that combining R&D incentives with carbon caps will cost the economy an order of magnitude less than relying on either R&D incentives or emissions reduction policies alone.³

2. Will the CCTP enable the Administration to meet its goal of cutting GHG intensity by 18 percent by 2012? Does the CCTP put the United States on a path to stabilizing GHG emissions?

The Plan is likely quite adequate for meeting the current goal of 18% reduction in intensity, but that is only because the goal largely reflects business as usual. But neither the Plan nor the 18% intensity reduction goal will put the U.S. on a path to stabilizing GHG emissions. Even if this goal is met, emissions will continue to rise rather than stabilize.

It should also be noted that the U.S. commitment under the UN Framework Convention on Climate Change, which is noted in the Plan, is not to stabilize emissions, but rather to stabilize atmospheric concentrations of GHGs. The UNFCCC commitment further specifies that concentrations should be stabilized “at a level that would prevent dangerous anthropogenic interference with the climate system.”⁴ While there is not yet a global consensus on the concentration at which this would occur, it is important to consider the full extent of this commitment in evaluating the Plan’s success in achieving it. Impacts generally considered to indicate dangerous interference range from the disintegration of the Greenland ice sheet, eventually raising sea levels by as much as 20 feet,⁵ increased hurricane intensity, compounding the danger to millions of citizens in the Southeast and Gulf coasts,⁶ depleted water resources in the Western United States due to reductions in winter snow pack,⁷ and the threat of extinction of thousands of species,⁸

³ See *Induced Technological Change and Climate Policy*, Lawrence H. Goulder, Pew Center on Global Climate Change, Arlington, Virginia, October 2004.

⁴ http://unfccc.int/essential_background/convention/background/items/1349.php

⁵ Alley, R.B., et al., 2005 “Abrupt Climate Change”

⁶ Emanuel, K, et al 2005 “Increasing destructiveness of tropical cyclones over the past 30 years

⁷ Mote, P et al., 2003 “Preparing for climatic change: The water, salmon, and forecasts of the Pacific Northwest.”

particularly those dependent on highly sensitive habitat (for example, polar bears, threatened by the melting of the arctic ice pack; pika, threatened by the desiccation of alpine meadows, and corals threatened by thermal stress and ocean acidification). Most experts now believe that a doubling of CO₂ concentrations (i.e., around 550 ppm) is too high to avoid dangerous interference with the climate system, such as the impacts just listed. We do not know what a safe level is, though many are proposing 450 ppm as a level that has potential to avoid large-scale effects on the climate. (See Schellnhuber, Cramer, Nakicenovic, Wigley and Yohe, 2006, “Avoiding Dangerous Climate Change,” Cambridge University Press.)

While it is understandable that the CCTP has not chosen a specific atmospheric concentration of GHGs to be achieved—this is not its charge—the absence of such a target in the nation’s strategy presents another difficulty in assessing the Plan’s likelihood of success. While a 450ppm constraint is considered in the Plan, it is the most stringent of all options considered. The other cases involve concentrations well above this level (up to 750ppm—almost a tripling of pre-industrial levels) and have a large potential to reflect dangerous anthropogenic interference. Given the Plan’s consideration of a range of potential stabilization targets, it would be far more helpful if the Plan described the pace and scale of deployment that would be needed to achieve each of the targets considered. A strategy for CO₂ stabilization at 450 ppm might look very different from a strategy for stabilization at 750 ppm, but those differences would not become evident unless the paths to the targets are outlined. This would aid policy makers in understanding the technological implications of various targets that might be adopted, as well as aid the CCTP in choosing its technology priorities.

Unfortunately, while the Plan gives a fine overview of GHG-reducing technologies and the role that each could play, the analysis of potential reductions is limited to scenarios that do not match current conditions or stated policy directions. As demonstrated in the estimates made in this Plan, it is mandatory emissions constraints in conjunction with technology investment—rather than technology investment alone—that will spur technology deployment and diffusion. In the absence of these constraints, the potential reductions outlined in this Plan will not be achieved.

3. Does the draft strategic plan provide an integrated framework of sound guidance, clear goals and next steps for agencies and researchers to use when prioritizing and selecting future research efforts? If so, please explain. If not, how should the Administration set R&D investment priorities among various climate change technologies and CCTP agencies?

The Pew Center is pleased to see that the plan does not pick winners, but rather it examines a broad portfolio of technologies that have the potential to reduce emissions on a large scale, making the most cost-effective technologies available for reductions in the future. The Pew Center supports the Portfolio Planning and Investment Criteria that the CCTP uses to evaluate various technologies: maximizing return on investment,

⁸ Thomas, C.D., et al., 2004 “Climate change and extinction risk”

supporting public-private partnerships, focusing on technology with large-scale potential, and sequencing R&D investments in a logical, developmental order are essential in determining what technologies to support. In addition to this evaluation of known technologies, efforts to explore new and innovative opportunities should also be promoted. The small portion of section 9 that describes the importance of doing exploratory research aimed at pursuing novel concepts not elsewhere covered should be given more emphasis. The fact remains that, while there are myriad technologies that we currently know can contribute to GHG emissions over the long term, it may be technologies that have not yet been discovered that will have the most impact. With accommodations for these unknown opportunities, the report acts as a useful summary of the current and future technologies that may have a significant impact on reducing carbon emissions if deployed.

Regarding your overarching questions 1 and 2, please see my response to questions 2 and 3 above. I would like to address your third overarching question specifically.

3. How could the CCTP plan be improved? What next steps are needed to implement a clear climate change technology strategy?

The U.S. Department of Energy is doing a good job in running a rational research and development program for technologies that are likely to contribute to solving the climate change problem in the future. As mentioned, however, what is lacking is an emphasis on deployment. Technologies that sit on the shelf are not useful. Deployment depends on private companies deciding to use these new technologies rather than their old, more carbon-intensive technologies. Without a mandatory GHG constraint, private companies do not have sufficient incentives to do so. The end result is an increase in technology innovation but little demand for those technologies in the market.

Finally, the technology initiatives discussed in the plan can only be effective if they are adequately funded and managed, and implemented with some urgency.

DOE and the other federal agencies run a mind-boggling collection of programs that could promote climate-friendly technologies. There are numerous domestic and internationally focused programs, many of these intended to advance the climate-friendly technologies we would want deployed, including the Asia-Pacific Partnership, Climate Leaders, Climate VISION, Climate Challenge, Clean Cities, the Hydrogen Fuel Initiative, the Carbon Sequestration Leadership Forum, the Methane-to-Markets Partnership, the Industrial Technology Project, the SmartWay Transport Partnership, the Partnership for a Hydrogen Economy, FreedomCAR, Energy STAR, Generation IV Nuclear Initiative, Vision 21, 21st Century Truck, Nuclear Power 2010, ITER22, FutureGen, Future Fuel Cells, Industries of the Future, and Turbines of Tomorrow.

While it is difficult to tell exactly how much has been budgeted for each of these programs, according to the Administration's Federal Climate Change Expenditures Report to Congress (April 2006), the total FY 2006 budget authority for all CCTP initiatives amounts to about \$2.8 billion, with a \$207 million increase proposed for 2007.

This increase is a step in the right direction, but it is not enough. In addition, it is crucial not just that these initiatives be funded, but that they be funded in a long-term, stable way—even forward-funded—to ensure that research managers are able to make the kind of plans that large-scale technology development requires.

Related to this is the challenge of implementing so many initiatives on a timely basis. Because it is far easier to explain to the press and public the launch of an initiative than to explain the boring details of its implementation, the political rewards of launching initiatives greatly outweigh those of implementation. Our sense is that DOE and the other federal agencies are doing a good job implementing these programs, but we are concerned that the Administration may not be placing sufficient priority on them.

It would be a shame if three years from now, in another oversight hearing, we learned that all these programs were under funded and given insufficient priority within the Administration. We simply cannot afford to lose the time.

I thank and commend the chair and the subcommittee for holding this hearing and for the opportunity to testify. The Pew Center looks forward to working with the subcommittee in its oversight capacity and on the development, enactment and implementation of any future climate change legislation.